

Electricity Deregulation: Doubts Brought On by the California Debacle

1.0 Introduction

The resurgence of the free enterprise spirit in public thinking over the last two decades has spearheaded the restructuring of several large industrial sectors in western economies.

Most notable among these are aviation, natural gas, communications and, more recently, the electricity industry. Deregulation of the latter has been of prime concern in many countries since the end of the 1980s. Proponents sell the merits of this open industry structure from both business and technical perspectives, all of which, they claim, should assure lower prices and better service to consumers. Up to now, over 30 countries have implemented or initiated electricity industry deregulation. In its completed form, the result has been a separation of hitherto vertically integrated electric utilities into several independent entities according to function (generation, transmission, distribution, retail and services), the fragmenting and possibly the sale of production assets to promote competition in supply, the opening of the industry to new participants, the removal of incumbent rights/obligations, and the creation of a new market environment for wholesale and retail electricity trading. The wholesale markets, also called spot markets, establish their electricity prices in real time as a function of short-term supply and demand functions provided by market participants through computer links. Deregulated electricity industries worldwide have reached various stages of this process.

In the United States, the electricity industry debated the issue of deregulation at length during the 1990s. Academics had long before championed the move, but the industry itself had been slow to act. Federal legislation in 1992 paved the way and indeed pushed individual states in the direction of deregulation. Little progress was achieved however until the end of 1995, when the Federal Energy Regulatory Commission (FERC) resolved questions regarding transmission access. California was one of the first states to promote deregulation. Starting from an initial proposal in 1994, interested parties expended much time and effort forging the design of their new, custom-made electricity industry model. Their implementation, inaugurated in April 1998, allows competing generators to sell into a central electricity market or to individual clients. During a transition period, the investor-owned incumbent utilities were to buy exclusively from that market, but would eventually be allowed other trading arrangements. They also serve as sole retailers to most consumers in their areas, but eventually that would also be opened up to competition. The incumbents remain the sole transmission service providers. Three new institutions coordinate commercial and technical activities in the new structure: a wholesale energy market (PX), regional market coordinators, and a power system operator called the Independent System Operator (ISO). These entities can process requests for energy and for transmission access on short notice, thereby enhancing electricity trading. For its first two years the California electricity market seemed, at least from the outside, to be quite successful. Elsewhere in the United States, groupings of utilities in the Northeast successfully implemented deregulation, with the mid-Atlantic PJM group actually being the first in January 1998. The success of these two markets provided impetus to the deregulation movement. Presently, half the states have either deregulated or have plans in the works to do so.

The California electricity market unexpectedly broke down in the second half of 2000. During that period, electricity prices there surged way beyond those in other American electricity markets saddled with many of the same rising fuel costs. Average daily prices for bulk power during the summer peak months were in the unusually high range of \$150 to \$200/MWh, but even after the peak period prices continued to rise. On one December day, the average daily price in California reached \$500/MWh, a tenfold increase over habitual average prices. The increases were sparked by a scarcity of energy resources, but were compounded by other factors. The two larger incumbent utilities, Pacific

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Abstract

Electricity industry deregulation has been actively sold around the world as a liberating economic force. Proponents of free market economics have all but promised cheaper electricity and better quality of service as a result of deregulation. Several countries have already accepted that reasoning and have proceeded with vast transformations of their electricity industries. By and large, results of these moves made during the 1990s had been deemed positive. It then came as a shock when the California electricity market, which had operated well since its debut in 1998, suffered severe volatility and extreme prices in the second half of 2000. In this paper, we review deregulation in general and the California case in particular, provide reasons for the debacle and suggest conditions for a successful electricity market.

Sommaire

Les promoteurs de la déréglementation dans l'industrie de l'électricité y ont vu un véhicule de progrès économique qui assurerait à la fois la diminution des prix et l'amélioration de la qualité de service. Plusieurs pays ont adopté ce raisonnement et ont procédé à de vastes transformations de leurs industries de l'électricité. Dans l'ensemble, les résultats des changements initiés pendant les années 1990 sont perçus comme étant positifs. La débandade récente du marché californien, suite à deux ans d'exploitation réussie, a donc soulevé la consternation. Dans cet article nous examinons la déréglementation en général et l'implantation californienne en particulier. Nous avançons des raisons pour la débandade, et nous suggérons des conditions minimales nécessaires pour assurer le succès d'une implantation.

Gas & Electric and Southern California Edison, are now saddled with huge debts, having been forced to buy at the going prices on the wholesale market, but being obliged to sell to its customers at lower fixed rates. A third incumbent utility, San Diego Gas & Electric, fulfilled certain conditions allowing it to pass on its own energy bills to consumers before the onslaught of the summer crunch. There, disgruntled consumers saw their electricity rates double over the time span of one bill. The severity of the crisis was generally recognized only after the larger incumbents sent out an alarm late in the year, when their financial situations had become precarious. Consequently, some neighboring utilities refused to sell into the California market, fearing default of payment, thereby reducing the pool of energy resources. All this resulted, starting in late fall, in regular rolling blackouts throughout the state. Authorities from FERC and the ISO tried to settle market prices with price caps, to no avail. Finally California legislators stepped in at the beginning of 2001 to suspend electricity market activities and to force producers into selling to the state at prices deemed reasonable. They also relaxed the screening process to facilitate the construction of new facilities, which could come on line as early as 2003. A fascinating account of the whole adventure can be found in documents at the web site <http://www.stoft.com/>.

Despite the suddenness of this situation, it can be argued that several long-term factors are largely to blame for the debacle. For one, no new generation or transmission has been built in the state for some time, despite the steady increases in load spurred by impressive economic growth. California supplements its own generation with large imports

from its neighbors, but little new energy has been made available from those sources as well. As a result, capacity reserves in California are now very low. Furthermore, many transmission corridors in the state are constantly congested. That is significant because market pricing rules force up prices for all energy consumed in times of congestion. To compound the problem, present water levels for hydro generation in the American West are low, and both fuel costs and emission credit costs have jumped dramatically over the last year. Naturally, the high input costs and the scarcity of energy have been reflected in the increasing electricity prices on the wholesale market. Adverse consumer demand could not be counted on to temper the high prices, unsuspecting consumers being shielded by fixed rates in most of the state.

Certainly the California adventure has sent shock waves throughout the industry, particularly within fledgling electricity markets and among undecided regulators. Some pundits now argue, after the fact, that this was a calamity just waiting to happen. However, the California market is similar in many ways to other, successful electricity markets. What, then, caused the collapse of the California market in particular? Now many observers are asking the ominous question: Whose next? Closer to home, could this market meltdown happen in Alberta or Ontario, the two Canadian provinces that have already adopted deregulation? Following a whirlwind tour of the deregulated electricity industry, the author will provide his analysis of the problem.

2.0 Electricity Deregulation Around the World

The 1980s served as a period of reflection for deregulators who saw advantages in breaking up the monopoly structure of the industry. They developed a general "philosophy" that would appeal to all energy market participants. Its main advantages were expected to be a reduction in energy prices through the opening of competitive energy markets, long-term gains in efficiency, the influx of private capital and the offering of new or improved services and products. New, more efficient producers would see their efforts rewarded with profits dictated by the marketplace. Leaders of the movement often shouted from the rooftops their abiding belief in free market principles, but in many cases the particulars of their national electricity industries dictated change. In addition to its stated advantages, deregulation was often a way out of a bind, and the untold advantages of industry reforms were actually important motivators. In several countries, the national debt stifled growth. There, the public sector could no longer meet the investment needs of the public electricity industry. Hence with deregulation and ensuing privatization, governments freed up public funds and collected much needed cash from the sale of industry assets. In most countries, deregulation provided an opportunity to rectify industry ills one way or another:

- by pushing through much needed corporate reorganization and downsizing, by enforcing efficient business practices,
- by repairing the wrongs of previous legislation, or
- by freeing utilities from unwanted externalities such as political meddling or the influence of militant unions.

Since 1982, several countries have enacted legislation to open their electricity industries to competition. Three countries are generally recognized as pioneers: Chile (1982), England and Wales (1990) and Norway (1990). The following paragraphs describe briefly the major implementations of deregulation in those and a few other countries.

Unbeknown to most industry observers in the English-speaking world, Chile undertook a bold plan of industry restructuring, passing legislation in 1982 and gradually implementing the plan through the decade. Many structural choices made in the Chilean reform were eventually copied elsewhere – in particular, the segmentation of the industry and the compulsory spot market using marginal pricing principles. The work produced in Chile inspired several similar initiatives in Latin America. Argentina, which experienced economic hardships similar to those in Chile, restructured in 1992. Gains in these two countries came mostly from the introduction of efficient business practices in an industry previously fraught with incompetence and rampant nepotism. Results were spectacular, as investment capital flowed into the countries, prices plummeted and the quality of service improved immeasurably. Several South American countries followed suit from

1993 to 1995, as did Central American countries in 1997. Brazil in 1998 and Mexico in 1999 also introduced plans to deregulate, but they cannot be said to favor the Chilean/Argentinean model.

Although not openly admitted, deregulation in England and Wales was a means to rid the electricity industry of its burden to subsidize the British coal industry and to reduce its work force. Supporters of deregulation in political circles quickly won the national debate, culminating in legislation in 1990 to start up a deregulated industry in 1991. The national utility was then split into three producers (eventually more private producers joined in), one transmission company and twelve regional distribution companies. The adopted market structure called for the compulsory participation of all energy traders in a national spot market. A single national energy price was set by the spot market auction based on marginal pricing practices, to which various general and regional uplifts were applied using a complex set of rules. Those rules have been criticized as being unnecessarily complex. The major criticism of English deregulation, however, has been that it allowed the incumbent energy producers to exercise market power, i.e., that their size allowed them to dictate prices above competitive levels. It is known that sellers under certain circumstances can keep prices unduly high by systematically manipulating marginal pricing. Analysis shows that average electricity prices did fall in England and Wales through the 1990s, but less than could be expected considering the dramatic drop in fuel prices. Unsuccessful attempts by the regulator to introduce greater competition among producers finally lead to a complete shift in trading rules. Initiated in 1998, the reforms will soon go into effect. Payments in the formal national market will now follow a pay-as-you-bid rule, and trading outside the formal market is strongly encouraged.

In the years preceding Norwegian deregulation, regulators there tried unsuccessfully to merge electricity companies in the hope that consolidation would bring greater efficiency and uniform prices throughout the country. Exploiting the country's abundant hydraulic resources, the over 80 producers and 200 regional distributors served their constituencies well, but on the whole the country had over-invested to build large capacity reserves. Deregulation became the mechanism for achieving the goal of national uniformity. Following legislation in 1990, reforms were initiated over a period of five years starting in 1991. Major changes were implemented immediately in 1991; they made the electricity market easily accessible to both producers and consumers, and made dealings transparent. Under deregulation, privatization and consolidation were not imposed, since the presence of numerous public producers reduced the eventuality of market power. The reform was seen to be successful as consumer prices quickly decreased. The Norwegian reform has spread to the other Scandinavian countries since 1995 in a market called NORDPOOL. The great novelty in this market is that formal trading mechanisms other than a spot market were put in place. These involve medium and long term forward and futures contract markets. Also, bilateral trading outside the formal markets is encouraged. Electricity prices offered by retailers are published in newspapers for all to see, and consumers can change retailers with minimal effort. These measures have certainly been a factor in maintaining competitive prices.

The English model spread to Scotland and Northern Ireland from 1990 to 1992, and certainly influenced other Commonwealth states such as Australia (since 1991), New Zealand (electricity reforms since 1987, deregulation since 1994) and the Canadian provinces of Alberta and Ontario. Reforms in Australia and New Zealand are considered successful. Before deregulation the electricity business in Australia and New Zealand was healthy, relying on cheap, abundant energy sources. In Australia, the states of Victoria and New South Wales proceeded with separate plans for deregulation. The most striking difference in approaches is that Victoria privatized its production assets, while New South Wales maintained its public ownership. After putting their reforms in place, the two states joined forces to form a national market. The amalgamation stabilized electricity prices by giving consumers access to a larger and more diverse production pool. New Zealand's industry makeup is partly similar to that of Norway. Before deregulation, one state producer, exploiting mostly small hydro power plants, supplied numerous municipal utilities. Deregulation there started at the retail level, with amalgamated incumbent distributors encouraged to

provide competitive retail services outside their borders, and with new retailers being formed. To promote competition in generation, the national producer has since been split up. Otherwise the government has kept regulations in the industry to a minimum. Factors contributing to the sustained competition in both countries have been the application of comprehensive and comprehensible market rules, segmentation of the industry (production down to the plant level in Australia, retail in New Zealand), and some public participation in the industry.

Although not a pioneer, the United States is certainly an important player on the world stage. The American electricity industry also had its unique problems leading up to deregulation. The oil crisis of the 1970s pushed the electricity industry towards alternative sources of energy. Many utilities opted for nuclear energy, not realizing how the required investments would eventually spiral out of control. Legislation called PURPA, passed in 1978, liberalized the energy industry by assuring green producers an outlet for their production. Utilities bought this energy in long term contracts at prices that, as it turns out, were way above market prices. Hence these measures forced large expenditures upon certain utilities. Being state-regulated, those utilities could not seek economic relief by investing in cheaper energy resources in other states. By the end of the 1980s, excess costs passed on by the most strapped utilities substantially raised consumer rates in many areas of the country, particularly in California and the Northeast. New legislation in 1992 finally addressed the problem by allowing for the creation of energy markets, the open access to transmission facilities and the participation of new energy providers. The law calls for state-by-state restructuring, but allows for unfettered commerce across their boundaries. Naturally, those areas with the highest electricity tariffs were the first to deregulate. As indicated already, California and the PJM system were the first to deregulate in 1998, and now New England and New York are nearing completion of their implementations. It is noteworthy that philosophies for market rules between east and west are quite different from one another. That has led to polite animosity between the two groups. The eastern approach, based on locational marginal pricing, had already been applied in New Zealand and now seems more widely accepted. Since 1998, other states, though not all, have pronounced themselves in favor of deregulation. The first step in regionalizing electricity trade is the creation of a regional ISO, now called an RTO. Presently six American regions fall under the supervision of ISOs, and a recent FERC ruling forces all regions to prepare plans to integrate into RTOs.

One last major player in the list is the European Union. After years of deliberation, they submitted a directive to its members at the end of 1996, requiring them to present plans by the start of 1999 for the opening of their electricity markets by the early 2000's. These plans are now being implemented. Note that Spain had already proceeded on its own with plans to deregulate. Other reforms that cannot be strictly classified as deregulation have been underway in Eastern Europe (privatization), Southeast Asia (liberalization similar to PURPA) and Southern Africa (international trade).

To the author's knowledge, four Canadian provinces have actively looked into deregulation. For British Columbia and Québec, minimal structural changes were made to ensure a continued participation in the lucrative American electricity markets. That involved the separation of the transmission provider from the rest of the provincial utilities, and modifications in legislation to allow open access to their transmission systems. Independent power producers and marketers aren't likely to proliferate in those provinces, since bulk rates offered by the incumbent utilities are among the lowest on the continent. British Columbia initially held bolder plans for complete deregulation, but has backed off over the last year. On the contrary, the complete deregulation package has been adopted in Alberta and Ontario. In fact, Alberta put in place its energy market in 1996. It floundered over its first two years, and it was reorganized along the lines of the British system in 1998. Contrary to common promises, electricity prices in Alberta have increased substantially since the inception of deregulation. Reasons cited are a quick expansion of load in the province, limited electricity reserves and market power exercised by the three large producers. The Alberta government recently announced rebates to relieve the burden on its con-

sumers. In the east, Ontario passed the needed legislation in 1998, has fragmented the old Ontario-Hydro into several companies including Ontario Power Generation and Hydro One (transmission/distribution), and is now poised to start up its electricity market.

3.0 Competitiveness in Electricity Spot Markets

With respect to the positive effect on consumer prices, we rate in Table 1 the success of the implementations described in the previous section.

Table 1: Ratings of implementations of deregulation

Rating	Implementations of deregulation
Success	Norway, Australia, New Zealand, PJM, Chile, Argentina
Partial failure	England and Wales
Failure	California from the summer of 2000 onward, Alberta
Too early to tell	The rest of Latin America, countries of the European Union

In spite of its success in lowering prices, the best measure of success of a market is probably its competitiveness. In the virtual electricity markets where haggling is impossible, competitiveness implies that the market rules must be well thought out. They must treat participants on a common footing and provide them with choice, but at the same time must be decisive and quickly implemented. The formal analysis of competitiveness in a market is a difficult task. It tries to separate true measures of market efficiency from extraneous factors, such as variations in costs of fuel or capital, climatic conditions, etc.

Whether competitive or not, the behavior of prices in electricity spot markets is prone to volatility. In addition to daily and seasonal peaks and valleys, occasional short-lived price spikes soar beyond the top of the graph. Analysis shows that in itself this behavior is not surprising and, in fact, periods of high prices are necessary for the financial health of the industry. To understand why, a short description of marginal pricing in electricity markets is provided.

Electricity spot markets are modeled on commodity markets. Buyers and sellers participate in an auction where they provide information on the prices and quantities they are willing to buy or sell. The auction caller tallies up the total demand and matches it with the least expensive offers. The most expensive offer to be retained determines the sale price for the entire lot being traded in that auction. This is called the marginal or spot price. Such an auction is performed every hour or half hour in electricity markets. Traditional tools for the dispatch of electricity were modified only slightly to perform this calculation. In auctions however, contrary to practices in traditional dispatching, production costs are replaced by production offers that need not reflect true costs. The price of the last retained watt becomes the sale price of all the energy sold at that time. Dispatch tools can also route energy to avoid overloading portions of the transmission system. The situation where some transmission lines are operating at a limit is called congestion. A region situated "behind" congested lines cannot receive additional power through the transmission system, and its additional energy sources are limited to its local area. Its marginal cost is then different from than that on the other side of the congested line. Actually, the presence of any congested line in a network imposes different marginal prices at every node of the network. This is called locational marginal pricing.

When a large base load plant supplies the last watt during low-load periods, the price of electricity is as low as it can get. During these periods offer surpasses demand, and sellers need to be competitive if they are to be retained in the auction solution. Under these conditions sellers extract little profit from their operation. Marginal prices for base load are roughly in the \$20 to \$30/MWh range, but in some markets (California for example) sellers have been willing to give away power rather than shut down their thermal or nuclear plants. At the other end of the load curve, when high-priced peaking generators supply the last watt, the price of electricity jumps. In that situation the marginal pricing mecha-

nism rewards the efficient sellers, since marginal prices for peaking units can run over the \$100/MWh range. Sellers recover their substantial fixed costs (capital costs, maintenance and general staffing) during these periods. Hence it is argued that these recovery periods are necessary if sellers are to make money. The problem in some markets, as indicated below, is that the level of recovery is not dictated by competitive forces, but rather is controlled by the sellers.

In a scenario where there are always several competing sellers available to provide the last watt, this market mechanism would yield the lowest average prices to consumers. In this case, the market price is not necessarily a low price, but it is a competitive price. Buyers on the wholesale market pay the spot price. They in turn become sellers on the retail markets; there they often average out their customers bills to avoid the confusion caused by the constantly varying spot prices.

There are potential problems with the marginal pricing mechanism as applied to electricity markets. Electricity markets are quite different from other commodity markets. First and foremost, electricity is an essential product, and most buyers are not in a position to "take it or leave it". Commodity markets do not share with electricity markets the urgency to supply the product, since in the former buyers can balk at high prices (and sellers at low prices). That is because the presence of stockpiles regulates the spot price. Stockpiles would have to be depleted (replenished) before trading would resume at extreme prices. Buyers of electricity by and large are not equipped to displace consumption from periods of high prices to those of low prices. As a result, their energy demands are often taken for granted by sellers no matter what the price. This places the seller in an advantageous position, and sets up opportunities for sellers to exercise market power in high system loading conditions. Periods during which system load surpasses say 85% of installed capacity typically occur twice a day for periods that can vary from a few weeks (winter peak in Québec) to a few months (summer peak in California). Periods of maintenance which limit system capacity can be just as vulnerable to energy shortages. During those periods, in many markets, the presence of all the major producers is required to satisfy the load. Producers who foresee the tight energy supply can submit a particular portfolio of offers to the market from their different power plants. Most are low-priced offers for large chunks of energy, all sure to make the cut in the auction, but a few very high-priced offers are thrown in. Prices of these offers often surpass the actual generation costs of the most economically inefficient generators. The latter risk setting the marginal price. No matter who sets a high marginal price, all sellers benefit. This auction is performed within the rules, and prices are pushed as far as the market can bear. It must be kept in mind however that in this case sellers control the market, as buyers are not adequately represented. It is clear that prices in California in the latter half of 2000 were caused by this kind of price manipulation. A situation that falls outside the rules involves the deliberate withholding of generation capacity or the creation of network congestion to create the same conditions of scarcity at lower load levels. Allegations of this sort of behavior have been put forth in some electricity markets, but they are difficult to prove. Market prices in either of these situations reflect scarcity and opportunity rather than actual costs. Extreme situations have arisen in the American Midwest and Northeast since 1998 where unexpected shortages and high loads pushed wholesale prices above \$6000/MWh for short periods.

Analysts have studied most electricity markets for signs of exercise of market power. The British market prior to its reorganization and the California market prior to its meltdown were extensively analyzed, as was to a lesser extent the Alberta market. In all three, analysts identified many situations during which the exercise of market power most likely resulted in high prices. Various authors also dug up indirect signs of abusive pricing: annual profits, executive salaries and bonuses remarkably higher than in the rest of the industry.

4.0 The Problems with the Deficient Markets

In essence, electricity markets work well only when competing forces are balanced at all times. As indicated above, this is a difficult condition to ensure in electricity markets. It requires abundance of the

product being sold, comprehensive market rules, transparency in dealings, choice for all participants, and vigilance on the part of participants and of impartial observers. Successful markets have met all of these conditions; one or more of these conditions was lacking in the deficient markets.

The most serious problem in the deficient markets is that sellers maximize their profits by exploiting scarcity. That occurs because consumers are inadequately represented in the auction mechanism. Previously in the regulated industry environment, consumers were represented by the regulator. Its departure leaves a void that has not been filled. Consumers in the deregulated environment do not have the opportunity to influence spot market prices, much less to refuse them, except by turning off the switch. Note that consumer mobilization to spot prices is a broad and difficult problem which has not yet been resolved. The alternative, shunned in the deficient markets, is to allow other forms of trading with direct contact between buyers and sellers. The English and California markets foresaw active consumer participation only after lengthy transition periods. California's problem is that it could not get through the transition period. In partial defence of California power producers, once the market got out of control it was impossible for any one of them to reverse the process. Any of the larger producers could set the high market price, and most probably took the position that "if we don't do it someone else will". Unwittingly they killed the goose that laid the golden egg.

Long term bilateral contracts between buyers and sellers are useful tools, but of themselves are not the answer to all woes. If sellers believe that high spot market prices can be sustained, they will refuse to enter lower-priced contracts. In markets exhibiting problems of market power, sellers have the leverage to maintain in their contracts the high prices otherwise anticipated on the spot market. That is the present situation in Alberta, where most of the power production has been auctioned off to retailers in large chunks over long term contracts. With only three major power producers and little import capacity, Alberta has no competition at the source, and so competition at the retail level offers little benefit. The recent offer by the Alberta government to reimburse consumers in response to high electricity prices is, in the author's opinion, an admission of defeat of their electricity market.

Price caps have been imposed in many markets, not so much to enforce competitive prices but more as a safety valve to guard against excessive prices. In December 2000, with prices running rampant, price caps were adjusted to various levels in California in an effort to stabilize prices. Rather than give in, sellers refused to sell at prices below the cap, and regulators quickly capitulated. That, in the author's opinion, was a high stakes game of chicken. Sellers, backed by a powerful FERC commissioner, argued that the high prices were needed to attract new investment. More on that aspect further, but it was quickly pointed out that at those recent price levels, the California power industry could have paid itself an expansion twice its present size in just ten years.

Up to now we have only described the mechanics of electricity markets. Here, finally, the notions of human presence, of vigilance and expectations should be introduced. Vigilance is exercised in a state's power industry as a whole by its governance. Representatives of the industry's stakeholders watch over the proceedings, signal conditions unfavorable to them, and generally influence the direction in which the industry evolves. Members of healthy governance must be given sufficient clout to defend their points of view. At the microscopic level, various advocate associations offer the same kind of visibility to their segments of the industry and to their members. These two groups form the much-needed independent observers alluded to earlier. The second term, expectations, relates to the reasonable objectives participants set for themselves. Buyers must realize that, as part of their electricity bills, they must pay a premium to attract investment for required growth. Sellers must realize that there is a limit to what consumers are willing to pay. A much-neglected aspect of deregulation, at least in the technical literature, is how human interaction is needed to forge and maintain a harmonious market.

Articles in a recent issue of IEEE Spectrum Magazine raised the spectre of market meltdown in the American Northeast next summer. That

region has seen high peak-load prices and intense price spikes during the last three years, but at most times prices are held in line. There is reason for concern for the next round, since producers certainly know by now when they hold market power. Hard reasons for optimism that markets will hold are that the East is fed by a much larger pool of competing producers than the West, and that utilities are at the same time both buyers and sellers. A soft reason for optimism, conveyed in an opinion heard by the author, is that the eastern utilities have maintained their traditional public role and their traditional expectations. We will get an indication next summer if that still holds true.

5.0 Longer Term Factors in Deregulation

The market pricing mechanisms described previously explain short term market behavior. The long term needs for industry investment and expansion are equally important when assessing market pricing. A few factors are briefly considered here.

Of prime importance, market prices should entice enough investment capital in the competitive portions of the industry to meet future needs. It is generally agreed that investors should be rewarded with reasonable rates of return, but traditional utility financing has been rather conservative compared to that in competing financial markets. Expectations of recent investors in the new electricity markets might have been too ambitious. Looking again at California, incumbent utilities sold their generating facilities at prices way above book value. In turn, the new owners justified high prices in an attempt to recover their investments as quickly as they would have with dot COM stocks. The outcome is history. Initial investor interest in generation expansion has been stalled by the uncertainty concerning expected prices in the expanded system, in part due to the volatility of present prices. Unreasonably high prices recently seen in California were not really attractive to investors because they were recognized as being untenable. Another factor impeding investment is the presence of direct and indirect barriers to entry such as licensing requirements, environmental studies, parliamentary commissions, etc. As a result, some electricity industries face the daunting situation of having no clear expansion plan and no real perspectives for expansion.

Investment in the transmission sector is also problematic. Transmission providers who collect so-called congestion rents have little incentive to expand, since expansion could alleviate congestion. They too exploit scarcity. The revenues of many transmission providers are regulated however, and they would have nothing to lose by expanding. The problem is that new transmission can miss the mark if, over the life of the new facilities, generation patterns shift around in the network. In this case, part of the projected transmission revenues would not be collected and the investor might incur a deficit. The absence of planning in generation expansion therefore induces uncertainty in transmission planning. In some countries, such as Chile and Japan, the proposed solution to transmission planning is to let public planners identify the needs for transmission expansion. They would then auction off rights to interested companies who would build and operate the new transmission facilities for profit.

The author believes that involvement, whether to plan, coordinate or simply facilitate expansion, remains an important responsibility of public institutions in the electricity industry. The decision to invest in generation or transmission facilities in a deregulated environment, however, ultimately lies with private enterprise, and is based on its anticipation of financial success in the marketplace.

6.0 Conclusions

Electricity deregulation has served both as a means to shake up poorly managed power industries and to promote efficiency in the healthy ones. Concentrating only on the latter, deregulation was oversold to consumers based mostly on promises of short-term benefits. Consumers in markets with an abundance of electricity resources reaped the expected benefits, but many others did not because of uncompetitive seller-biased markets. There, spot markets using marginal pricing could not be expected to sell the same limited resources at lower prices than

the regulated utility. Besides prices, much-promised innovative services such as custom power and financial services have rarely appeared anywhere.

If a region's regulated electric utilities are willing and capable to support future expansion, if their financial positions are sound and their rates are advantageous, and if their energy sources are still plentiful, then regulators should take note that full deregulation offers no real benefit. That seems to be the present position taken by Québec, the author's home province. For others, deregulation is an option worth pursuing. The author feels that the real benefits of deregulation should be expected in the long run. The potential of deregulation comes from the opening of the industry to new players and their vast resources of capital, technologies and expertise. Eventually, the efficient expansion brought about by their participation should assure a greater degree of competitiveness to the market.

The contents of this paper are summarized in the form of recommendations, which could help in establishing the merits of deregulation for a given implementation:

- A competitive industry is a prerequisite for deregulation. This involves the active participation of many buyers and sellers, and to lesser degrees of regulators and planners.
- Electricity trading must be open, transparent, and as unconstrained as possible. Several trading mechanisms should be encouraged and results of trade on public markets should be easily accessed.
- Each transitional phase of a deregulation plan must maintain a competitive environment.
- The market doesn't regulate itself into higher states of grace all by itself. Market rules must be carefully thought out to avoid market power, but even so, watchdogs from the outside should scrutinize the markets and react to anomalies.
- The ultimate caution: You can't fix a broken electricity industry just by deregulating it.
- Private industry should not be expected to invest billions of dollars over night if healthy incumbent utilities show no inclination.
- Don't wait until energy reserves are non-existent to deregulate. This is a corollary of the previous statement.
- Segmentation of the industry makes certain issues fall through the cracks. Planners should handle such issues.
- Public interest must be considered.
- The governance of the new institutions should assure some form of continuity from a regulated to a deregulated environment.

Let us end with a few comments on the Ontario plan for deregulation. Ontario embarked on this path motivated in part by the idea that new players could harness the latest generation technologies. It is realized however that for the time being Ontario Power Generation (OPG) is by far the province's largest electrical energy provider. In the absence of competition in the new market, strong regulation will be maintained to mitigate market power. OPG agreed to revenue caps during a transition period of 10 years, after which divestitures will have reduced its provincial market share to 35%. On the retail side, it is hoped that the close to 300 municipal utilities will act as strong advocates for consumers. The protracted transition market is then something of a novel hybrid. This author feels that it will take some time before competitive forces can develop in such a scheme.

About the author

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